

THE AHRENHOLZ TECHNIQUE FOR ATTRACTING TROPICAL SKIPPERS (HESPERIIDAE)

Additional key words: Pyrrhopyginae, Pyrginae, Hesperinae, army ants, behavior.

Skippers (Hesperiidae) constitute a large component of tropical butterfly communities. In South America, sites in mature lowland tropical forest may contain several hundred species. Although some species, especially those favoring clearings and heavily disturbed forests, may be locally common, most forest skippers occur at low population densities, as is generally true for tropical butterflies (Ebert 1969). Their swift, erratic flight is difficult to follow, and oftentimes, they are extremely wary. Thus, collecting and photographing forest skippers is difficult.

Various methods overcome the problem of sampling species that are otherwise rare and wary. Some butterflies are attracted to traps baited with rotting animals, excrement, decaying fruit, or pheromones. Others seek mud or sweaty clothes, presumably attracted to the sodium chloride. Malaise and light traps also may sample otherwise scarce species, and colored pieces of cloth, paper, or plastic can be effective in drawing high-flying species to the ground. Some butterflies, such as Ithomiinae and Danainae, seek pyrrolizidine alkaloids, whether in the nectar of Asteraceae or in decaying heliotrope plants (Boraginaceae).

Most skippers are not attracted to bait traps, show no interest in colored rags or plastics, and generally are not collected in Malaise and light traps. Only a small percentage of skippers sip moisture at mud, and most of these are males. Flowering shrubs or trees, which are heavily frequented by both sexes, are very scarce or patchy in South American rain forests and usually occur 20-45 m above the ground in the canopy.

It has been observed repeatedly, however, that many hesperiid species visit fresh bird droppings in the interior of the forest (mostly upon leaves or the ground) or on rocks, stones, or sand on river banks. Further, a number of otherwise scarce skippers congregate in the neighborhood of army-ant (Formicidae: Ecitoninae) swarms in southeastern Peru (Lamas 1983), where they feed on antbird (Formicariidae) droppings. Taking advantage of these peculiar congregations, first described by Zikán (1929) for Brazilian skippers, we have collected some species that are poorly represented in collections. Unfortunately, the thick underbrush and wariness of these skippers still makes it difficult to approach them.

The purpose of this note is to report a new method, which we name the "Ahrenholz Technique," for attracting skippers in Neotropical rain forests. It was devised and successfully used by our good friend David Ahrenholz in Rondônia, Brazil and eastern Ecuador. After he described the method to us in 1990, we experimented with it at Pakitza, Manu National Park; at Tambopata, Tambopata-Candamo Reserved Zone; and at Pampas del Heath National Sanctuary, in southeastern Peru (see Erwin 1985, 1991, Lamas 1985, Lamas et al. 1991 for location and description of the two former sites). We summarize our observations and those of Ahrenholz.

The Ahrenholz Technique

We placed small (ca. 1 cm²), approximately square, pieces of toilet or tissue paper, wetted with saliva, on the uppersides of exposed, broad leaves, or on cleared patches of ground. These pieces of paper have a rough resemblance to fresh bird droppings and attracted many species of skippers, Nymphalidae (*Caeruleptychia*, *Pyrrhogyra*, *Adelpha*, *Nessaea*, *Catonephele*, *Marpesia*, *Memphis*, *Heliconius*, *Forbestra*), Riodinidae (*Euselasia*, *Ancyluris*, *Thisbe*), and Pieridae (*Dismorphia*). Other insects, including small flies, wasps, and orthopterans, visited the paper too. We also placed similar pieces of wet paper on sand at river banks, where only skippers and a few flies were attracted. We experimented with white, sky blue, light green, and light pink colored pieces of paper, without perceiving any differences in attractiveness. The exact shape of the paper did not seem to matter much either.



FIG. 1. *Astraptes fulgerator* (Walch) (Pyrginae), on right, and *Aides duma argyrina* Cowan (Hesperiinae), attracted using the Ahrenholz technique, at Fazenda Rancho Grande, Rondônia, Brazil. Photograph courtesy of D. Ahrenholz.

A skipper, on discovering a piece of paper, landed quickly upon it, extended its proboscis and probed the wet paper for several seconds to a few minutes (Fig. 1). It remained wary, but was relatively easy to approach because we placed the paper in an exposed site. If the butterfly was collected, we replaced the paper, which usually fell into the net or on the ground, and wetted it again because dry paper was less attractive to the skippers. Although butterflies investigated paper wetted with rain water, they flew off after extending their proboscides. Other liquids, such as urine and sweetened soft drinks, did not work as well as saliva. Inside the forest, the paper attracted butterflies even if no ants were present, although with less success. Along river banks, they were effective whenever skipper butterflies were in the area.

Although skippers may use olfactory and/or auditory cues generated by the ants, their prey, and/or the antbirds to find ant swarms, they appear to locate bird droppings, or their "mimics" (the pieces of paper) visually, as shown at the river banks, where no ant swarms have been observed.

We list the skipper genera collected at Pakitza and Tambopata in October 1991, and at Pampas del Heath in June 1992, using the Ahrenholz Technique: A) Inside the forest. Pyrrhopyginae: *Jemadia*; Pyrginae: *Phocides*, *Phanus*, *Udranomia*, *Epargyreus*, *Augiades*, *Aguna*, *Polythrix*, *Chrysoplectrum*, *Urbanus*, *Astraptes*, *Dyscophellus*, *Telemiades*, *Pachyneuria*, *Clito*, *Zera*, *Quadrus*, *Gindanes*, *Milanion*, *Anastrus*, *Antigonus*, *Aethilla* and *Achlyodes*; Hesperinae: *Vidius*, *Vettius*, *Justinia*, *Ebusus*, *Tigasis*, *Thoon*, *Talides*, *Tisias*, *Carystus*, *Carystoides*, *Perichares*, *Orses*, *Lycas*, *Metron*, *Phemiades*, *Panoquina*, *Oxyntes*, *Niconiades*, *Aides*, *Saliana*, *Thracides*, *Aroma* and *Pyrrhopygop-*

sis. B) At river banks. Pyrrhopyginae: *Pyrrhopyge*, *Elbella*, and *Jemadia*; Pyrginae: *Phocides*, *Proteides*, *Epargyreus*, *Polygonus*, *Antigonus*, *Anastrus*, *Ebrietas*, *Camptopleura* and *Cycloglypha*; Hesperinae: *Metron*, *Lindra* and *Panoquina*.

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LITERATURE CITED

- EBERT, H. 1969. On the frequency of butterflies in eastern Brazil, with a list of the butterfly fauna of Poços de Caldas, Minas Gerais. *J. Lepid. Soc.* 23, Suppl. 3, 48 pp.
- ERWIN, T. L. 1985. Tambopata Reserved Zone, Madre de Dios, Peru: History and description of the Reserve. *Rev. Per. Entomol.* 27:1-8.
- 1991. Natural history of the carabid beetles at the BIOLAT Biological Station, Rio Manu, Pakitza, Peru. *Rev. Per. Entomol.* 33:1-85.
- LAMAS, G. 1983. Mariposas atraídas por hormigas legionarias en la Reserva de Tambopata, Perú. *Rev. Soc. Mex. Lepid.* 8(2):49-51.
- LAMAS, G. 1985. Los Papilionoidea (Lepidoptera) de la Zona Reservada de Tambopata, Madre de Dios, Peru. I: Papilionidae, Pieridae y Nymphalidae (en parte). *Rev. Per. Entomol.* 27:59-73.
- LAMAS, G., R. K. ROBBINS & D. J. HARVEY. 1991. A preliminary butterfly fauna of Pakitza, Parque Nacional del Manu, Peru, with an estimate of its species richness. *Publ. Mus. Hist. Nat. UNMSM (A)* 40:1-19.
- ZIKÁN, J. F. 1929. Myrmekophilie bei Hesperiden? *Entomol. Rundschau* 46(7):27-28.

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